Acta Arachnologica, 64(1): 5–9, August 31, 2015

Records of brown widow spider, *Latrodectus geometricus* Koch 1841, (Araneae: Theridiidae) from Gujarat, western India, with notes on its distribution, habitat and natural history

Anirudh G. Vasava[1]*, Mehul Patel[1], Bhavbhuti M. Parasharya[2], Vishal Mistry[1], Prathmesh Patel[1], Dhaval Mehta[1], Dhaval Patel[1] & Kaushal Patel[1]

[1] *Voluntary Nature Conservancy, 101-Radha Darshan, Behind Union Bank, Vallabh Vidyanagar-388120, Gujarat, India*
[2] *AINP on Ornithology, Anand Agricultural University, Anand-388110, Gujarat, India*
* *Corresponding author. E-mail: aniruddh.vasava@gmail.com*

Abstract — New distribution records of populations of the *Latrodectus geometricus* Koch 1841 (Araneae: Theridiidae) from Gujarat in India is recorded. Information on its behaviour in captivity, diet and habitat preference is also provided. Accidental synanthropic introductions are the most likely cause of these additional records.

Key words — *Latrodectus geometricus*, spiders, new records, urban habitat, distribution, Gujarat, western India

Introduction

Members of the genus *Latrodectus* Walckenaer 1805 is notorious over the world due to their mate feasting behavior by females and medical significance of the potent neurotoxin they possess (Mc Crone 1965, Garb et al. 2004). This genus is represented by 31 species globally, many of which are cosmopolitans occurring over many continents (Platnick 2014). Only *L. hasselti* Thorell 1870 was reported from present India until 2007, mostly from the western parts (Pocock 1900, Daniel & Soman 1961, Tikader 1987, Siliwal & Kumar 2001, Siliwal & Molur 2007, Hippargi et al. 2012). Later on *L. geometricus* Koch 1841 was reported from Pune, Maharashtra (Shukla & Broome 2007) and *L. elegans* Thorell 1898 from Ukhrul district, Manipur (Kananbala et al. 2012). The last one to be added to the widow spiders in India was *L. erythromelas* Schmidt & Klaas 1991 from Hyderabad, Andhra Pradesh (Srinivasulu et al. 2013), making it a total of four species of widow spiders presently occurring in India.

Brown widow spider, *L. geometricus*, also known as brown button spider or gray widow spider is a cosmopolitan spider distributed over United States, South America, Australia, Southern Africa and parts of Asia (Pocock 1900, Levi 1959, Garb et al. 2004, Brown et al. 2008, Vincent et al. 2008, Platnick 2014). Its active spread in U.S.A. is attributed to human assisted movement (Garb et al. 2004). *L. geometricus* seems to prefer urban habitats and has a microhabitat preference that allows great prevalence in areas lacking suitable protection for other *Latrodectus* spp. reported from urban areas (Vetter et al. 2012). In Asia the species has been reported from Japan (Ono 1995), Iran (Rafinejad et al. 2007) Turkey (Bayram et al. 2008), Israel (Levy & Amitai 1983), Indonesia (Brown et al. 2008), Philippines (Keegan et al. 1950), Pakistan (Pocock 1900), Myanmar (Pocock 1900) and India. Thought to be native to Africa (Garb et al. 2004), in the last century it has expanded its range around the world probably due to globalization. As stated above, in the present India, the species was reported from Pune, northern Maharashtra and so far remains the only record of this species in India. Virtually nothing is known about this species in India. In this paper we provide additional records of *L. geometricus* from various parts of Gujarat, western India with observations on its habitats and natural history.

Observations

Vallabh Vidyanagar (Anand)

On 10th October, 2013, the second author (MP) sighted a mature female under a wooden stool in a local gym at Vallabh Vidyanagar, Anand, Gujarat. On close inspection a male was sighted under the same stool. Both male and female were photographed, collected and kept in captivity for behavioral observation. All the specimens were deposited at the Anand Agricultural University, Gujarat. Another female was found with hatchlings on 25th October, 2013 from the same gym hiding behind a pipe attached with a wall. A thorough search of the place resulted in a total record of 30 individuals (4 males and 26 females). Of these females, six females had egg sacs and 3–4 females had hatchlings in their web. We kept taking incidental observations of the spiders and their behavior at this place. Vallabh Vidyanagar

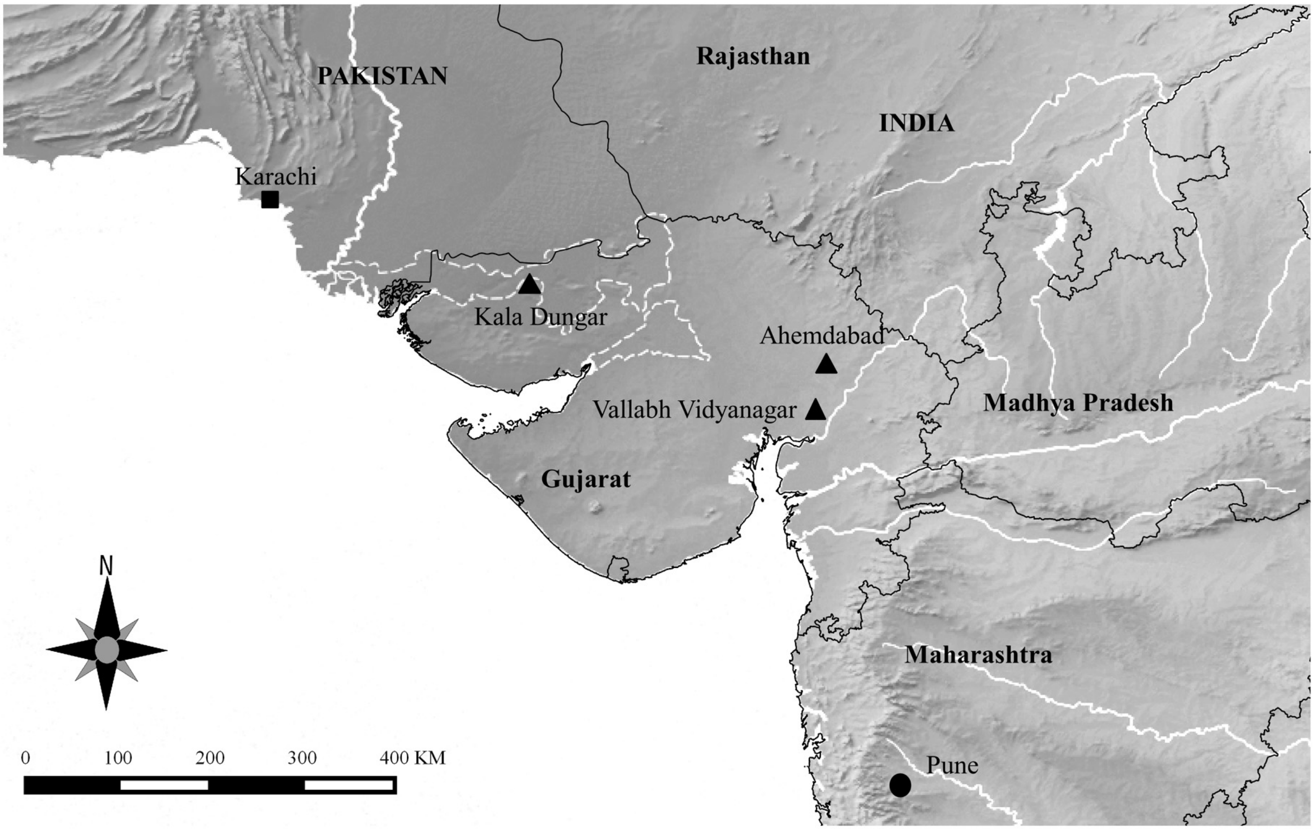

Fig. 1. Map showing present and earlier records of *Latrodectus geometricus* from western India. Square, record from Pakistan; triangles, present records from Gujarat, India; circle, earlier record from Maharashtra, India.

is a small town having a large number of educational institutions and students across the country besides locals. The town is 7 km from district headquarters of Anand District. The mean temperature here ranges from 30°C (86°F) in summer to around 15°C (59°F) in winter.

Kaladungar (Kachchh)

During our stay at the Kaladungar or Black Hill in Kachchh District, we (AV, VM & KP) sighted a female under a wooden table on 28th October, 2013. Presence of the typical egg sac of the species (Abalos 1962) also assisted us in confirming the identification of species After searching the whole place, we recorded a total of 46 females and 14 males in entire housing complex. Among these individuals, 21 females were recorded with egg sacs. Two females and 3 egg sacs were collected for further observations. Kaladungar is the highest point in Kachchh, at 462 m msl and is located 97 km north to Bhuj city. Kaladungar lies in one of the hottest areas of India (Arid zone) with summer maximum temperatures averaging 41°C (105.8°F). Winter maximum temperatures reduce dramatically and can go below 0°C (32°F). Kaladungar and the adjacent areas represent rocky habitats, with or without thorny scrubs like *Prosopis juliflora* and *Euphorbia nivula*. It is located very close to international border between India and Pakistan.

Ahemdabad

One of us (VM) collected three females and one male on 8th August, 2014. All the three females laid egg masses at later dates. He could locate thirty females and five males with several egg sacs in the hospital premises. The spiders occupied space below wooden benches, tables, bird cages, windows, all within two to three feet above ground. Within this hospital premises, brown widows were found in a restricted area. This particular area of the hospital also had presence of red-backed widow spider (*L. hasseltii*) during April 2013. No red-backed widow spiders were observed at this place during August 2014.

Distribution and natural history observations

Brown widow spiders were recorded from three Districts of Gujarat within one year's duration (Fig. 1). The records from Anand and Ahemdabad Districts are from urban area occurring in semi-arid zone whereas the record from Kachchh is from an isolated human dwelling of arid zone. This species has an affinity for human structures and residential buildings (Bayram et al. 2008, Vetter et al. 2012), but also seems to prefer vegetation outside the houses in gardens and parks (Simo et al. 2013). All of the individuals recorded by us were observed in urban environments inside houses and buildings. Although there were no specific places where these species constructed their webs, the most

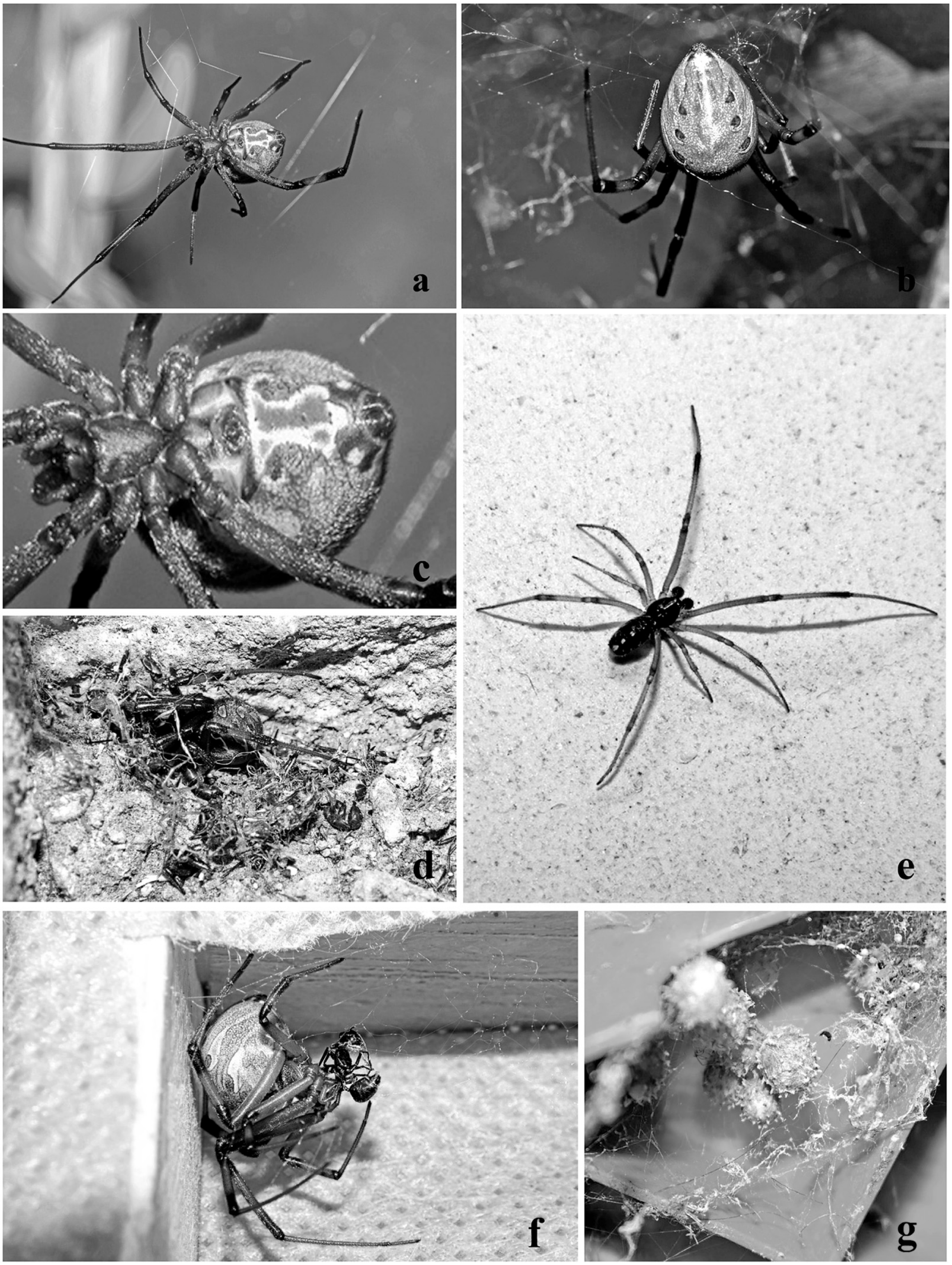

Fig. 2. *Latrodectus geometricus* Koch 1841. a, ventral view of an adult female; b, dorsal view of an adult female; c, hourglass marking on the ventral side of an adult female; d, a female with exoskeletons of its prey in its web; e, an adult male; f, a female with a Crossopriza sp. catch; g, typical egg sacs with spike like protuberances. (Photographs- Dhaval Mehta and Prathmesh Patel)

common sites where the webs were constructed were underneath of chairs, tables, beds, closets and wash basins, corners of windows, doors, attics, and walls as well as wall crevices, and in a few cases corner of the house roof. They seem to prefer sites that are secluded and stationary for long periods. Most of the females observed constructed their webs mostly from near the ground up to 2 meters high. Whenever the spider was disturbed, it will go to retreat located in the top of the web with central disc (Eberhard et al. 2008). Our observations of the egg sac morphology were not different from that observed elsewhere (Vincent et al. 2008), with all the egg sacs covered with pointed projections (Fig. 2). Our scanty observations in the gym in Vallabh Vidyanagar showed that these spiders majorly preyed on cockroaches, black ants and occasionally crickets. We also observed exoskeletons of other spiders in their web belonging to the genus *Crossopriza* at Kaladungar.

Position maintained by female in captivity was similar to the observations of Shukla & Broome (2007). The female, kept in a glass jar, mostly maintained an inverted position with its legs pulled inward underneath the mouth of the jar which was covered with a cloth. Irregular strands underneath the cloth surface were also observed as noted by Shukla & Broome (2007). On the basis of our observations in the gym regarding its food, black ants, cockroaches and crickets were provided as food in captivity. The female immediately captured the prey, wrapped it up and kept it aside in the web. The spider ate mostly in privacy or in dark, except on few occasions where it started eating just after capturing and immobilizing the prey, in our presence. As previously reported (McCrone 1964, Brown et al. 2008, Simo et al. 2013) their behavior clearly was non-aggressive. Whenever disturbed the female withdrew into their silken retreats. On one occasion, while approaching the female for taking pictures, it dropped from its web and exhibited a prolonged thanatosis.

Discussion

The occurrence of *L. geometricus* in India was based on only a single report (Shukla & Broome 2007), and there was no other report on its distribution in India. Present occurrence of the species from three sites in Gujarat indicates new information on the distribution and range extension of this species. The record from Kaladungar in Gujarat extends the known range of the species by about 730 km north of Pune, and by about 265 km southeast of Karachi (Pakistan), and it is northern-most and western-most report of its occurrence in Indian subcontinent (Fig. 1). Invasion of this species into several countries is thought to be assisted by human transport system, and in newly occupied areas their first records come mostly from the sea ports and from urban area (Garb et al. 2004). Contrary to this trend, none of the Indian records, including earlier ones, are from sea port. Although the one individual female recorded by Shukla & Broome (2007) was found on forest floor, our records were within buildings and houses which suggest that the habitat selection by this species in India is similar to that observed in U.S.A. (Brown et al. 2008, Vetter et al. 2012) and elsewhere (Ono 1995, Simo et al. 2013). Further studies to assess spider diversity, especially in urban landscape is needed. Concentrating research on forested areas has probably hindered our understanding of this and other species of *Latrodectus*.

Acknowledgements

We thank Shabbir Ajmeri & Rupa Jadeja, owners of the gym at Vallabh Vidyanagar for allowing our untimely intrusion in the gym for carrying out observations and providing support. We also express our gratitude to Shervin Everett, for helping us in locating the species from Ahemdabad, Gujarat. Authors are also thankful to Mr. Siddharth Kulkarni, Yashavantrao Chavan Institute of Science for his guidance and suggestions during the identification of specimens.

References

Abalos, J. W. 1962. The egg-sac in the identification of species of *Latrodectus* (Black-Widow Spiders). Psyche, 69: 268–270.

Bayram, A., Danisman, T., Yigit, N., Kunt, K. B. & Sankac, A. 2008. A brown widow spider new for the Turkish araneo-fauna: *Latrodectus geometricus* C. L. Koch, 1841 (Araneae, Theridiidae). Turk. J. Arachnol., 1: 98–103.

Brown, K. S., Necaise, J. S. & Goddard, J. 2008. Additions to the known U.S. distribution of *Latrodectus geometricus* (Araneae: Theridiidae). J. Med. Entomol., 45: 959–962.

Daniel, J. C. & Soman P. W. 1961. Observations on the spider *Latrodectus hasselti indicus* Simon with a note on arachnidism. J. Bombay Nat. Hist. Soc., 58: 823–826.

Eberhard, W. G., Barrantes, G. & Madrigal-Brenes, R. 2008. Vestiges of an orb-weaving ancestor? The "biogenetic law" and ontogenetic changes in the webs and building behavior of the black widow spider *Latrodectus geometricus* (Araneae Theridiidae). Ethol. Ecol. Evol., 20: 211–244.

Garb, J. E., González, A. & Gillespie, R. G. 2004. The black widow spider genus *Latrodectus* (Araneae: Theridiidae): phylogeny, biogeography, and invasion history. Molecul. Phylogen. Evol., 31: 1127–1142.

Hippargi, R. V., Bolde, P. M., Manthen, S. V. & Shaikh, A. R. 2012. Ecology of venomous spider *Latrodectus hasselti* Thorell, 1870 (Araneae: Theridiidae) from Solapur and Osmanabad District, Maharashtra. Indian J. Arachnol., 1: 169–174.

Kananbala, A., Manoj, K., Bhubaneshwari, M., Binarani, A. & Siliwal, M. 2012. The first report of the widow spider *Latrodectus elegans* (Araneae: Theridiidae) from India. J. Threat. Taxa, 4: 2718–2722, <http://dx.doi.org/10.11609/JoTT.o3152.2718-22>.

Keegan, H. L., Blauw, A. S. & Anderson, R. I. 1950. *Latrodectus geometricus* Koch on Luzon. Amer. J. Trop. Med., 30: 901–907.

Levi, H. W. 1959. The spider genus *Latrodectus* (Araneae, Theridiidae). Transac. Amer. Microscop. Soc., 78: 7–43.

Levy, G. & Amitai, P. 1983. Revision of the Widow-spider genus *Latrodectus* (Araneae: Theridiidae) in Israel. Zool. J. Linnean Soc., 77: 39–63.

Mc Crone, J. D. 1964. Comparative lethality of several *Latrodectus* venoms. Toxicon, 2: 201–203.

Ono, H. 1995. Records of *Latrodectus geometricus* (Araneae: Theridiidae) from Japan. Acta Arachnol., 44: 167–170.

Platnick, N. I. 2014. The world spider catalog, version 15. American Museum of Natural History, online at http://research.amnh.org/entomology/spiders/catalog/index.html DOI: 10.5531/db.iz.0001

Pocock, R. I. 1900. Fauna of British India, Arachnida. Taylor and Francis, London.

Rafinejad, J., Tirgari, S., Biglarian, F. & Shemshad, K. 2007. Systematics, bioecology, and medical importance of Widow Spiders (Lathrodectus spp.) in Khorasan Province, Iran. Iran. J. Arthropod-Borne Diseases, 1: 52–57.

Shukla, S. & Gour-Broome, V. 2007. First report of the brown widow spider, *Latrodectus geometricus*. C. L. Koch, (Araneae: Theridiidae) from India. Current Science, 93: 775–777.

Siliwal, M. & Kumar, D. 2001. Rare sighting of poisonous spider *Latrodectus hasselti*i indicus Simon (Araneae: Theridiidae) in the cotton field of Baroda District, Gujarat. Current Science, 81: 1170–

1171.

Siliwal, M. & Molur, S. 2007. Checklist of spiders (Arachnida: Araneae) of South Asia including the 2006 update of Indian spider checklist. Zoos' Print J., 22: 2551–2597.

Simó, M., Dias, M. F. R., Jorge, C., Castro, M., Dias, M. A. & Laborda, Á. 2013. Habitat, redescription and distribution of *Latrodectus geometricus* in Uruguay (Araneae: Theridiidae). Biota Neotrop., 13: 371–375.

Srinivasulu, C., Srinivasulu, B., Javed, S. M. M., Seetharamaraju, M., Jyothi, S. A., Srinivasulu, C. A. & Tampal, F. 2013. Additions to the araneofauna of Andhra Pradesh, India - part II. Records of interesting species of the comb-footed genera *Latrodectus*, Rhomphaea and Coleosoma (Araneae: Theridiidae). J. Threat. Taxa, 5: 4483–4491.

Tikader, B. K. 1987. Handbook of Indian Spiders. Zoological Survey of India, Calcutta, 251 pp.

Vetter, R. S., Vincent, L. S., Danielsen, D. W. R., Reinker, K. I., Clarke, D. E., Itnyre, A. A., Kabashima, J. N. & Rust M. K. 2012. The prevalence of brown widow and black widow spiders (Araneae: Theridiidae) in urban southern California. J. Med. Entomol., 49: 947–951.

Vincent, L. S., Vetter, R. S., Wrenn, W. J., Kempf, J. K. & Berrian, J. E. 2008. The brown widow spider *Latrodectus geometricus* C. L. Koch, 1841, in southern California. The Pan - Pacific Entomol., 84: 344–349.

Received November 19, 2014 / Accepted January 24, 2015